DOCUMENT RESUME

ED 315 310 SE 051 205

TITLE Grade 6 Science Curriculum Specifications.
INSTITUTION Alberta Dept. of Education, Edmonton. Curriculum Branch.
PUB DATE May 86
NOTE 17p.
PUB TYPE Guides - Classroom Use - Guides (For Teachers) (052)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Elementary School Science; Evaluation Criteria; Foreign Countries; *Grade 6; Guidelines; Intermediate Grades; *Objectives; *Science Curriculum; Science Education
IDENTIFIERS *Alberta

ABSTRACT

This material describes curriculum specifications for grade 6 science in Alberta. Emphases recommended are: (1) process skills (50%); (2) psychomotor skills (10%); (3) attitudes (10%); and (4) subject matter (30%). Priorities within each category are identified. (YP)

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GRADE 6 SCIENCE
CURRICULUM SPECIFICATIONS

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May 1986

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GRADE 6 SCIENCE CURRICULUM SUMMARY

	Per Cent Emphases
PROCESS SKILLS	50
Communicating	4
Observing	4
Measuring	4
Classifying	4
Inferring	7
Predicting	7
Controlling Variables	8
Interpreting Data	8
Experimenting	2
Hypothesizing	1
Defining Operationally and Formulating Models	1
PSYCHOMOTOR SKILLS	10
Manipulating	4
Constructing	2
Calibrating	4

	Per Cent Emphases
ATTITUDES	10
Awareness	2
Appreciation of Living Things	2
Self-Confidence	2
Concern for Energy Resources	2
Continuing Interest in Science	1
Appreciation of Science	1
Value of Science	
SUBJECT MATTER	30
MATTER AND ENERGY	14
Energy Resources and Conservation	4
Electricity	4
Light	2
Changes in Matter	3
Sound	1

	Per Cent Emphases
LIVING THINGS AND ENVIRONMENT	12
Environment and Ecosystems	6
Adaptations	3
Environmental Factors	3
EARTH, SPACE, AND TIME	4
Weather	2
Water and Land	2

PROCESS SKILLS

Priority		Per Cent Emphases
	Communicating	
A	- Drawing simple diagrams, pictures, and maps of increasing sophistication	
A	- Writing units of measurement and their symbols	
A	- Constructing simple pictographs and bar graphs	
A	- Extending sophistication in graphing to include histograms, use of coordinate systems, circle graphs	
A	- Recording responses by using simple symbols (e.g. x's, ✓'s)	4
A	- Filling in charts and using simple symbols	
A	- Using number symbols	
B	- Describing with clarity ideas and intuitions	
B	- Using audio-visual techniques in accentuating reports (written and oral)	
C	- Describing observations verbally and in written form	
	Observing	
A	- Distinguishing between observations and inferences	
A	- Describing objects, change, and interaction in objects in the environment	
A	- Making predictions and inferences on the basis of observation	
C	- Identifying, by using the five senses, properties or characteristics of objects	4
C	- Describing an object verbally and in written work on the basis of sensory information	
C	- Describing quantitative characteristics of objects	
C	- Describing qualitative changes in objects	

CODE: A - High Priority, B - Medium Priority, C - Low Priority

Priority		Per Cent Emphases
	Measuring	
A	- Collecting data and using appropriate measuring devices	
A	- Performing necessary mathematical operations when taking measurements	
A	- Selecting appropriate units of measurement	
A	- Perceiving mathematical relationships between the units of measurement	
A	- Organizing measurement data into communicable forms, such as graphs, charts, tables	
A	- Making inferences and predictions from the measurement data	
A	- Using simple instruments for measurement	4
A	- Selecting appropriate devices for measuring	
A	- Estimating the approximate measurement of an object	
B	- Constructing simple instruments for measurement	
C	- Making comparative measurements - lighter than, heavier than	
C	- Ordering on the basis of comparative measurement	
A	- Using appropriate measuring devices with skill	
C	- Using arbitrary units (washers, paper clips, swings of a pendulum)	
C	- Discovering need for standard units	

Priority		Per Cent Emphases
	Classifying	
A	- Identifying the condition or basis of a given classification set	
A	- Constructing classification schemes or keys diagrammatically, or in some other communicable form	
A	- Identifying, through deductive thinking, an unidentified object in a classification scheme, given various classification conditions	
B	- Applying some form of self-devised classification scheme on any given set of objects, situations, or events	4
C	- Classifying objects according to attributes or properties (color, shape, size, texture, etc.)	
C	- Classifying objects first on the basis of one property, then on two properties, and so on	
C	- Classifying objects, situations, or events according to given or self-imposed conditions	
	Inferring	
A	- Distinguishing between observation and inferences (realizing that an inference is an explanation of an observation)	
A	- Recognizing that inferences are, by nature, tentative. Children demonstrate this understanding by wording their statements about inferences using terms such as "I think it is ...", "It might be ...", etc.	
B	- Making as many observations as possible, and choosing only those inferences that account for all observations made	7
B	- Testing inferences by making more observations, and revising inferences if additional observations do not support the original inference	

Priority		Per Cent Emphases
	Inferring (cont'd)	
B	- Making and testing inferences when confronted with unfamiliar phenomena	
B	- Applying the inferring process to situations that require direct observations	
C	- Making observations by using all five senses	
	Predicting	
A	- Testing the results of a prediction by: a. teacher-directed tests b. student-constructed tests	
A	- Retesting the results of previous incorrect predictions	
A	- Controlling variables that may affect a prediction	7
A	- Recording the prediction, and the outcome of the prediction, in symbol or written form	
A	- Making predictions from recorded data, e.g. map, graph, or model	
A	- Constructing reasonable predictions	
B	- Determining the dependability of a prediction	
C	- Stating a prediction based on past experience	
C	- Measuring for accuracy	

Priority		Per Cent Emphases
	Controlling Variables	
A	- Identifying variables that might influence a phenomenon that is being investigated	
A	- Identifying which variables should be kept the same in an investigation, and which variables should be changed	8
A	- Designing simple investigations in which one variable is changed and all others are kept the same	
A	- Demonstrating ways to keep variables constant while changing one variable in a variety of situations	
	Interpreting Data	
A	- Identifying patterns	
A	- Extracting useful information	8
B	- Generalizing from the patterns	
B	- Organizing observations meaningfully through the use of tables, charts, and graphs	
C	- Recording observations	
	Experimenting	
A	- Applying problem-solving skills, given an identified problem	2

Priority		Per Cent Emphases
	Hypothesizing	
A	- Considering and examining critically all possible explanations	
A	- Identifying influencing variables	
A	- Constructing testable hypotheses	1
B	- Demonstrating ability to make serious guesses or explanations regarding observations of an event or situation	
	Defining Operationally and Formulating Models	
A	- Writing an operational definition of an object or event for which the child has had direct experience	
A	- Writing more than one operational definition for a given object or event	1
C	- Identifying an operational definition from a list	
C	- Distinguishing between operational definitions and nonoperational definitions	

SUBJECT MATTER

MATTER AND ENERGY

Priority		Per Cent Emphases
	1. Energy Resources and Conservation	
	Students will:	
C	- IDENTIFY and DESCRIBE examples of energy forms and uses	
B	- CLASSIFY energy resources as renewable or nonrenewable	
B	- COMPARE alternative energy sources, e.g. solar, wind, and nuclear energy	4
A	- GATHER, ORGANIZE, and INTERPRET data about energy use, and INFER the effects of this use on the environment	
A	- DEMONSTRATE ways in which energy can be conserved in the home and the school	
	2. Electricity	
	Students will:	
A	- CONSTRUCT simple electrical circuits using a bulb, wire, and a cell	
B	- CONSTRUCT and DEFINE OPERATIONALLY open and closed circuits	
A	- CONTROL VARIABLES in a simple circuit to show their effect on the circuit	4
A	- PREDICT the effects on simple circuits when bulbs, wire, and cells are connected in different ways	
A	- INFER the path that electricity travels in hidden circuits	
B	- TEST the transmission of electricity through a variety of materials, and INFER that some materials conduct electricity better than others	

Priority		Per Cent Emphases
	3. Light	
	Students will:	
B	- DEMONSTRATE that a beam of light can be reflected or refracted, and the degree to which this happens depends on the color, lustre, and composition of the material	
B	- OBSERVE that an object can be seen when it reflects light, or is a source of light	
A	- OBSERVE light reflecting off a mirror and INFER that light usually travels in a straight line	2
A	- PREDICT possible paths of light under various conditions	
C	- OBSERVE that light becomes less intense as the distance between the observation and the source increases	
A	- OBSERVE and DESCRIBE the effect that lenses, mirrors, and prisms have on light	
	4. Changes in Matter	
	Students will:	
A	- OBSERVE, DESCRIBE, and INFER changes in the state, shape, size, and composition of matter	
C	- INFER that change has taken place by using such indicators as litmus or BTB	
C	- OBSERVE that heating matter results in expansion, and cooling results in contraction	3
B	- OBSERVE processes such as rusting and burning, and INFER that such processes result in changes in composition because they are not easily reversed	
B	- OBSERVE processes such as melting/freezing, evaporating/condensing, and INFER that such processes result in changes of state, shape, or size because they are easily reversed	

Priority		Per Cent Emphases
	5. Sound	
	Students will:	
A	- OBSERVE, DESCRIBE, and DEMONSTRATE conditions necessary to produce sound	
A	- IDENTIFY and CONTROL variables that cause changes in sound	
B	- OBSERVE and INFER that solids transmit sound better than liquids and gases	1
C	- OBSERVE that sound becomes less audible as the distance from the source increases	
C	- DEMONSTRATE that materials vary in their ability to transmit, reflect, or absorb sound	
B	- DESCRIBE some of the possible effects that sound of various kinds has on people and the environment	

LIVING THINGS AND ENVIRONMENT

Priority		Per Cent Emphases
	1. Environment and Ecosystems	
	Students will:	
B	- OBSERVE and DESCRIBE characteristics of a local environment	
A	- COLLECT and RECORD information regarding the interacting factors within an environment	
C	- CLASSIFY components of an environment as living or non-living	
B	- CLASSIFY living components of an environment as producer, consumer, or decomposer	6
A	- INFER interactions and interrelationships to describe a food chain within an environment	
B	- IDENTIFY possible causes of change in a particular system	
B	- INFER possible effects of changes which may occur in an ecosystem	
	2. Adaptations	
	Students will:	
A	- OBSERVE plant and animal characteristics and behaviors, and INFER their adaptive function	
C	- CLASSIFY adaptations as behavioral or structural	3
A	- TRACE the life cycle of an organism, and DESCRIBE the special adaptive characteristics at each state	
B	- CLASSIFY animals as predator or prey on the basis of their special adaptations	

Priority		Per Cent Emphases
	3. Environmental Factors Students will:	
A	- DESIGN and CONSTRUCT systems to determine how organisms respond to changes in their environment	
A	- CONTROL VARIABLES such as temperature, light, and moisture, and describe the response of the organisms to these changes	3
A	- INFER the types of natural habitats of organisms on the basis of their response to factors such as temperature, light, and moisture	

EARTH, SPACE AND TIME

Priority		Per Cent Emphases
	1. Weather	
	Students will:	
A	- GATHER, RECORD, and GRAPH weather data and, on the basis of previous patterns, PREDICT possible future weather conditions	2
A	- CONSTRUCT simple weather instruments and use them to measure and record weather factors	
	2. Water and Land	
	Students will:	
A	- OBSERVE and DESCRIBE changes in physical features of the earth, and INFER that the earth's surface is in continuous change	
A	- OBSERVE changes in the surface of the land caused by wind and running water, and INFER that these have altered some of our major land forms over time	2
C	- OBSERVE and INFER the stages (phases) of the water cycle	
B	- OBSERVE, DESCRIBE, and INFER that the quality of water (and water systems) is influenced by natural phenomena and human activity	